18. (a) Sketch and demonstrate the working of breeder reactor.

(b) Demonstrate the applications of radioactive isotopes in medicinal and industrial sector.

19. (a) Discuss the oxidation states and magnetic properties of Lanthanides.

(b) Discuss in detail the biomedical applications of nanomaterial.

20. Discuss the following :

(a) Iron-Sulphur proteins (5)

(b) Nitrogen cycle (5)

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APRIL/MAY 2025

GCH22/DCH22 — INORGANIC CHEMISTRY – II

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. If you are heating NaCl in the presence of sodium produces greenish-yellow color. What would be the reason for the observed color?

2. What is mean by hysteresis?

3. Define isotones and isobars.

4. What is meant by neutron cross section?

5. Is graphite a better moderator than water?

6. Point out the limitations of radiometric titration?

7. List out the differences between SEM and TEM.

8. Write the principle of electrospinning method.

9. Differentiate enzyme and coenzyme.

10. Define the term cofactor.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Write a short note on X-ray and neutron diffraction analysis techniques.

Or

(b) Demonstrate the working principle of *n*-and *p*-type semiconductors.

12. (a) Illustrate the importance of n/p ratio in predicting the stability of the nucleus.

Or

(b) Distinguish chemical and nuclear reaction.

13. (a) Explain the working principle of linear accelerators.

Or

(b) Write a note on neutron activation analysis.

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14. (a) Distinguish lanthanides and actinides.

Or

(b) Highlights the applications of nanomaterials in the field of optoelectronic.

15. (a) Distinguish between oxy and deoxy forms of hemoglobin.

Or

(b) Examine the structure, spectroscopic properties and function of rubredoxin.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. (a) Write a note on superconductors, solid state electrolytes.

(b) Give a brief account on Bravias lattice.

17. Give a comparative account on the working principle and applications of ionisation chamber, Geiger-Muller and proportional counters.